



# Space News Roundup

Vol. 32

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No. 6

## Metric facts as close as a computer

Have a question about JSC's change over to the metric system of measurement? Want to know the latest on-site transition activities?

Now, JSC employees don't have to wait for the latest information — it's as close as the nearest computer terminals.

A Metric Bulletin Board has been established on the SED and PROFS electronic message systems. The bulletin board serves the dual purpose of providing employees with a range of metric resource materials and of communicating committee information to members involved in the metric program.

The bulletin board menu will provide eight areas of information and resources:

- Current Information — Includes meeting notices and meeting minutes after each metric meeting, as well as additions to bibliographies and other information of interest.

- JSC Committee and Meeting Minutes — Includes members' names and previous meeting minutes.

- EA Committee and Meeting Minutes — Includes names of the Engineering Directorate members and previous meeting minutes.

- JSCMD 2220.5, Use of SI Units — Includes the entire text of the currently approved version for reference purposes.

- Conversion Factors — A list of conversion factors for reference purposes only until personnel are accustomed to thinking in metric.

- General Information — Includes information from all other categories that is no longer required in that category but is kept for general reference.

- Technical Library Bibliography — A listing of the metric reference documents available in the Bldg. 45 Technical Library.

- MSO Bibliography — A listing of the metric reference documents available in EA13, Bldg. 13, Rm. 204.

Keep in mind that the information now posted on the bulletin board is an initial and incomplete set that will be updated over the next few months. Any employee who doesn't have access to either SED or PROFS may contact their Information Systems Directorate coordinator to establish an account and log-on procedures. Computers with customized log-on procedures may require special adaptation.

Anyone with a question about or recommendations for the JSC Metrication Program or Board is encouraged to call their directorate representative:

Human Resources, Glen Van Zandt, x33069; Administration, George Huff, x34108; Flight Crew Operations, Larry Neu, x30559; Mission Operations, Jefferson Powell, x34138; Engineering, Joe Maloy, x30451; New Initiatives, Jerry Woodfill, 283-5364; Center Operations, Joe Pouzar, x30597; Safety, Reliability and Quality Assurance, Marie Prebilsky, x37134; Information Systems, Charles Krpec, x37678, or James McGee, x37540; Space and Life Sciences, Bill Sheegog, x33647; and White Sands, Troy Estes, 505-524-5732



JSC Director Aaron Cohen, left, and Rep. Mike Andrews, D-Texas, discuss the status of Space Station Freedom with reporters in JSC's Bldg. 2.

## State of the station

*Gramm, Andrews confident station won't be cut*

**By Kelly Humphries**

Texas Sen. Phil Gramm and Rep. Mike Andrews visited JSC this past week for briefings on Space Station Freedom progress in the wake of recent cost growth and in advance of what is expected to be another tough battle over the fiscal 1994 budget.

Space station managers briefed Andrews on Monday and Gramm on Wednesday, telling them that the center is well on its way toward building the fundamental backbone of the orbiting laboratory.

Both said they are confident that the station's will not be cut from the 1994 budget, but that NASA can expect a long, hard battle over the appropriations.

Gramm, who has taken retired Sen. Jake Garn's place as ranking Republican on the appropriations subcommittee that deals with NASA's budget, said he is concerned that lawmakers may try to trim too much from the Freedom budget at a critical time in its development, leading to delays, higher costs and ultimately an inadequate facility.

"You're building things that have to perform, that have to deliver, that have to be operated on some kind of economical scale," Gramm said. "I am concerned that with the debate we are currently in, with

the trial balloon having been floated that we could possibly see the termination of space station, that there will be those who say that whatever funding we get obviously is a good thing without really focusing on the fact that we have a job to do, that we have something to build and that it has to work and it has to perform its mission."

Space Station Projects Manager John Aaron told Gramm that Freedom is now in its final design stage. JSC, under Work Package 2, has released about 13,000 flight hardware blueprints and built more than 400 pieces of hardware, he said, and about 50 percent of the 500,000 lines of computer code that will be used to get Freedom to a man-tended configuration.

"The early assembly of flight hardware is in production," Aaron said. "We're building flight hardware. We also have all the procurements under way to go build and acquire the additional material to build the later launches in the sequence."

Gramm likened the current situation — where in fiscal 1994 the space station work force is expected to reach its zenith — to one where all the contractors show up to work on a house and then are told that there is not going to be as much work as had been promised.

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## Columbia launch to be delayed

*High pressure oxidizer turbopumps replaced*

**By James Hartsfield**

Columbia's launch on STS-55, originally targeted for about Feb. 25, will be delayed by at least two weeks to around the second week of March while technicians at Kennedy Space Center replace the high pressure oxidizer turbopumps in each of its three main engines.

Shuttle managers decided to replace the turbopumps after a review of paperwork being closed out for the flight could not verify that tip seals on the pumps had been inspected. NASA's double-check of paperwork performed in preparation for the mission found that the types of retainers used on Columbia's pumps could not be verified nor could any records of inspections of the pumps.

For the tip seals, two versions of retainers are used, the original version and another that was modified. Use of the original version requires an inspection of gaps in the seals prior to installing the pumps. Use of the modified retainers does not require an inspection.

As a precaution, managers decided to replace the pumps with those that have been verified ready for flight. The replacement work will be performed with Columbia remaining on Launch Pad 39A.

Meanwhile, managers met Thursday at KSC for a review of other mission preparations. However, a firm launch date for STS-55 will not be known until the work on replacing the pumps is well under way.

The crew — Commander Steve Nagel, Pilot Tom Henricks, Mission Specialists Bernard Harris, Charles Precourt and Jerry Ross, and German Payload Specialists Hans Schlegel and Ulrich Walter — participated in a dress rehearsal countdown Thursday and Friday at KSC.

The Spacelab D-2 crew will work for nine days on more than 90 different investigations into fluid physics and human physiological changes in microgravity that will bridge the gap between STS-61A, the first German Spacelab mission that flew in October and November 1985, and make the transition into the space station era. Additional experiments will continue investigations of the Earth's atmosphere, its topography, as well as galactic astronomy and technology development.

Work readying Discovery for STS-56, slated for a late March launch, remains on schedule at KSC with Discovery aimed toward a move from its processing hangar to the Vehicle Assembly Bldg. around the first of the month.

Technicians will check the paperwork on the oxidizer turbopumps on Discovery's engines, and inspect them before flight if necessary.



## New training courses support JSC continuous improvement

The Human Resources Development Branch will soon be offering a number of new training sources to support the center's continuous improvement efforts.

An information package that contains the course listings, descriptions and target audiences will be sent to supervisors this week. All employees will receive the same information in about two weeks.

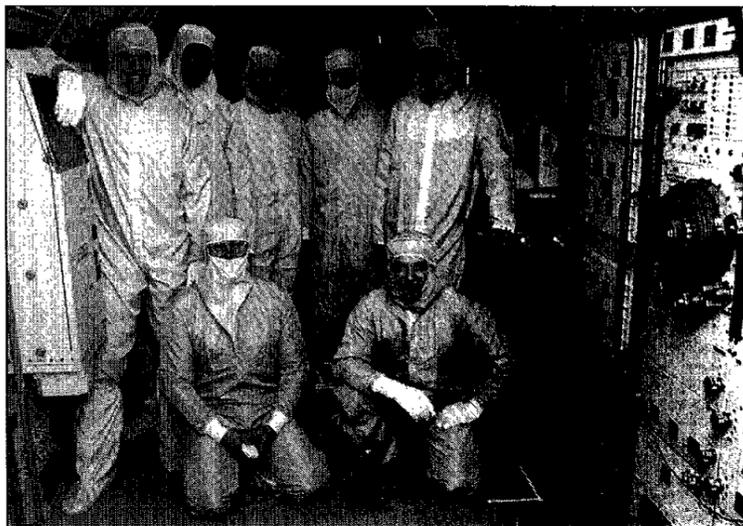
The curriculum reflects a mix of courses; some that have been offered previously and some that were developed specifically to meet needs identified through a training needs assessment survey completed in August 1992. There are a number of courses in areas such as empowerment and leadership, pro-

cess improvement, measurement and team skills.

"We hope that employees will meet with their supervisors to jointly decide what courses best support their individual and organizational needs," said Susan Braymer, chief of the Human Resources Development Branch.

Some of the pilot courses that are being developed will be tried between now and June. And, starting in July, the Total Quality courses will be integrated with the rest of the classes in the training enrollment package sent to all organizations.

If you have any questions about the new classes, call the Human Resources Development Branch at x35266.



The STS-55 crew poses inside the Spacelab D-2 module. Knelling are Jerry Ross, left, and Charles Precourt. Standing, from left, are Ulrich Walter, Bernard Harris, Hans Schlegel, Tom Henricks and Steve Nagel.

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# Ticket Window

The following discount tickets are available for purchase in the Bldg. 11 Exchange Gift Store from 10 a.m.-2 p.m. weekdays. For more information, call x35350 or x30990.

EAA Aspects of Love (2 p.m. Feb. 28, Music Hall); \$28 each, limit four.  
EAA Houston Livestock Show and Rodeo (Astrodome, upper level); \$9, limit 4 tickets. Call x35350 for dates.

Space Center Houston — Discount tickets: adult, \$7.50; child (3-11) \$4.50; commemorative: \$8.75.

Metro tickets — Passes, books and single tickets available.  
Movie discounts — General Cinema, \$4.50; AMC Theater, \$3.75; Loews Theater, \$4.

Entertainment '93 and Gold C coupon books, stamps, Walt Disney Club memberships, business cards, stamps and souvenirs also available.

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# Gilruth Center News

**Sign up policy** — All classes and athletic activities are first come, first served. Sign up in person at the Gilruth Center and show a badge or EAA membership card. Classes tend to fill up four weeks in advance. For more information, call x30304.

**EAA badges** — Dependents and spouses may apply for photo identification badges from 6:30-9 p.m. Monday through Friday. Dependents must be between 16 and 23 years old.

**Defensive driving** — Course is offered from 8 a.m.-4:30 p.m. March 6. Cost is \$19.

**Weight Safety** — Required course for employees wishing to use the Gilruth weight room is offered from 8-9:30 p.m. Feb. 23. Pre-registration is required; cost is \$5.

**Aerobics** — High/low-impact classes meet from 5:15-6:15 p.m. Tuesdays and Thursdays. Cost is \$32 for eight weeks.

**Exercise** — Low-impact class meets from 5:15-6:15 p.m. Mondays and Wednesdays. Cost is \$24 for eight weeks.

**Bench aerobics** — Class meets from 5:15-6:15 p.m. Mondays and Wednesdays. Cost is \$32 for eight weeks; participants must provide their own benches.

**Aikido** — Martial arts class meets Tuesdays from 6:15-8 p.m. Cost is \$15 per month.

**Tennis** — Beginner tennis class meet 5:15-6:45 Mondays starting March 1. Advanced beginner class meets 5:15-6:45 p.m. Wednesdays starting March 3. Cost is \$32 for six weeks.

**Scuba** — Four-week session meets Tuesdays and Thursdays beginning March 25 at the Gilruth Center. Total cost is \$190, with \$50 paid at registration.

**Fitness program** — Health Related Fitness Program includes medical examination screening, 12-week individually prescribed exercise program. Call Larry Weir, x30301.

**JSC Golf Association** — JSCGA is accepting members for the 1993 season. League fee is \$55; maximum handicap is 36. First tournament is Feb. 20. For more information, call Mike O'Reilly, 283-9242.

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# Dates & Data

## Today

**Call for papers** — The 1993 Conference on Intelligent Computer-Aided Training and Virtual Environment Technology has issued a call for abstracts due by Feb. 15. JSC will co-sponsor ICAT/VET '93 with the U.S. Army Training and Doctrine Command. Send abstracts of up to 250 words to R. Bowen Loftin, PT4. For exhibits information, call Don Myers, 283-3821. For registration information, call x39071.

**Cafeteria menu** — Special: meat sauce and spaghetti. Entrees: franks and sauerkraut, sweet and sour pork chop with fried rice, potato baked chicken. Soup: cream of potato. Vegetables: French beans, buttered squash, lima beans.

## Tuesday

**Blood drive** — Lockheed will host a blood drive from 8-11:30 a.m. and 1-3:30 p.m. Feb. 16 in Lockheed Plaza 1 Rm 12C, 2450 NASA Road 1. For more information, call Joe Vistor at x34791. For scheduling, call Paul Wheat at x30192.

**Cafeteria menu** — Special: smothered steak with dressing. Entrees: beef stew, liver and onions, shrimp Creole. Soup: navy bean. Vegetables: buttered corn, rice, cabbage, peas.

## Wednesday

**TQM Brown Bag** — A TQM Brown Bag Seminar will discuss "Quality Function Deployment — Fundamentals and Recent Experiences" at noon Feb. 17 in Bldg. 12, Rm. 254. For more information, call Cyndi Draughon at x33071.

**Astronomy seminar** — The JSC Astronomy Seminar will meet at noon Feb. 17 in Bldg. 31, Rm. 129. Dr. Martin Duncan of Queens University, Ontario, will discuss "Is the Solar System Stable?" For more information, call Al Jackson at 333-7679.

**Blood drive** — Mitre Corp. will host a blood drive from 8-11:30 a.m. in the parking lot at 1120 NASA Road 1. For more information, call Irwin Feig at 333-0935. For more information, call Joe Vistor at x34791. For scheduling, call Paul Wheat at x30192.

**Toastmasters meet** — The Spaceland Toastmasters Club will meet at 7:15 a.m. Feb. 17 at the House of Prayer Lutheran Church. For more information, call Jim Morrison at 480-9793.

**Cafeteria menu** — Special: salmon croquette. Entrees: roast beef, baked perch, chicken pan pie. Soup: seafood gumbo. Vegetables: mustard greens, Italian green beans, sliced beets.

## Thursday

**Space Trophy banquet** — The Foundation for the Rotary National Award for Space Achievement will host its annual awards banquet at 6:30 p.m. Feb. 18 at the Hyatt Regency Downtown. Norman R. Augustine, chairman and chief executive officer of Martin Marietta Corp., will be the keynote speaker.

**Cafeteria menu** — Special: stuffed cabbage. Entrees: beef tacos, ham and lima beans. Soup: beef and barley. Vegetables: ranch beans, Brussels sprouts, cream style corn.

## Friday

**Black history** — JSC's Black Employment Program Council will sponsor a Black History Observance luncheon at 11:30 a.m. Feb. 19 at the Gilruth Center. Keynote speaker will be Curtis Franklin II, newsletter editor for The Network Group. For more information, call Black Employment Manager Charles Hoskins at x30607.

**UNIX group meets** — The JSC UNIX Systems Administration Group will meet at 2 p.m. Feb. 19 in Bldg. 12, Rm. 254/256. Jim Molini will discuss "Computer Security Incident Handling." For more information, call Mark Hutchinson at x30738.

**Cafeteria menu** — Special: Salisbury steak. Entrees: fried shrimp, deviled crabs, ham steak. Soup: seafood gumbo. Vegetables: buttered carrots, green beans, June peas.

## Sunday

**Call for abstracts** — The sponsors of the Joint Applications in Instrumentation, Process and Computer Control 1993 Symposium have issued a call for papers relating to the theme "Innovative Engineering for Productivity," due Feb. 21. The University of Houston-Clear Lake, the Instrument Society of America and the Institute of Electrical and Electronics Engineers are sponsoring the March 26 symposium at UHCL. Send abstracts of 250 words or less to Dennis Lawler of the Intelligent Systems Branch, ER22. For more information, call Lawler at x32037, or Dr. Thomas Harman at 283-3774.

# Swap Shop

Swap Shop ads are accepted from current and retired NASA civil service employees and on-site contractor employees. Each ad must be submitted on a separate full-sized, revised JSC Form 1452. Deadline is 5 p.m. every Friday, two weeks before the desired date of publication. Ads may be run only once. Send ads to Roundup Swap Shop, Code AP3, or deliver them to the deposit box outside Rm. 147 in Bldg. 2. No phone or fax ads accepted.

## Property

**Sale:** Shoreacres, 4-2-2, pool, new carpet/linoleum, extra wooded lot included, trees, \$89K. 333-7615 or 470-2592.

**Sale:** Dickinson, 4-3-2D, study, game rm, screen porch, lg kit w/Jennaire, new ceramic tile, util rm inside, lot w/trees, pkg for boat/MH, \$129.9K. Coy, x39282 or 335-0641.

**Lease:** Missouri City, 4-2-5-2, recent updates, 2100 sq ft, avail now, ex cond, \$975/mo., free lawn maint. x33786 or 835-3200.

**Sale:** Lake Livingston, Impala Woods at Onalaska, 30 X 70 lot, camp or build, util avail, paved roads, \$3K. Teena, x37787 or 422-6369.

**Sale:** CLC, 3-3-2, game rm w/8' pool tbl, glassed to 34' swimming pool, den, formal dining/living rm, \$101K. 488-4117.

**Lease:** Baywind I condo, 2-2, FPL, ceiling fan, miniblinds, W/D cond, re-frig, assigned parking, pool, \$550/mo + dep. Kelly, 282-4255 or 471-1420.

**Sale:** Lake Travis lot, Lago Vista, golf course, 2 country clubs, swimming, tennis, \$15K. 335-0527.

**Rent:** Breckenridge, CO, ski house, sleeps 12. 303-482-9124.

**Sale:** Nassau Bay, 3-2-2 TH, recently remodeled, 2-story, Italian tile, ceiling fans, 1700 sq ft, W/D, \$87K. Meg, 488-8267.

**Rent:** Taos, NM, ski house, sleeps 4, wkly rentals. 532-2082.

**Sale:** Dickinson Bayou, 4-2-5-2, pool, 100 yr old trees, .738 acre, sec sys, formal dining, water conditioner, \$229K. x34354 or 337-1640.

**Sale:** Bandera Hill Country, 1 acre lot in devel w/pool, Medina River frontage w/27 acre park, util. Plauche, x39034 or 474-2660.

**Lease:** League City, 4-2-2, formals, FPL, lg fenced yard, no pets, avail 4-15. x31440 or 333-5693.

**Sale:** 3-2-2D, formals, oversized wooded lot w/pool, no approval assumption, \$99.5K. 337-2671.

**Sale:** Pipers Meadow, 4-3-2, 2-story, corner lot, game room w/pool tbl, 2500 sq ft, \$109K. 480-0125.

**Lease/Sale:** Nassau Bay TH, 4-2-2, 2000 sq ft, master dn, new carpet, paint, tile, 2-story LR, atrium, deck, lg gar, \$1095/mo, 1-3 yr lease or \$119.9K. Jerry, x38922 or 488-5307.

**Sale:** CL Shores, 3-2, 950 sq ft gar, game room, loft, FPL, boatslip, \$122.5K. 538-1849.

**Rent:** Galv condo, furn, sleeps 6, Seawall & 61st St, pools, cable, wknd/wkly, daily rates. Magdi Yassa, 333-4760 or 486-0788.

## Cars & Trucks

'90 GEO Metro, 4 DR, AM/FM. \$3.6K OBO. Mandy, 283-5779 or 480-1236.

'87 Chevy Camaro IROC Z-28, 305 V8, auto, PW/PDL, PHATCH, map lights, new tires, red, 120K mi, \$4K OBO. x38785 or 409-945-3235.

'70 Convertible Mustang, \$1K. Tamara, 282-4455.

'76 Dodge PU, 4 x 4, green, 16" tires, 3 spd w/granny. 944-9761.

'83 Porsche 911, gold/brwn, good cond. x33786 or 835-3200.

'84 Pontiac LE6000, wht, new tires, AC needs work, \$1.9K. x36604 or 482-7156.

'82 Toyota Tercel, 5 spd, 2 DR, new clutch, nearly new tires, good cond, \$1050. 282-5447 or 721-9081.

'91 Toyota Previa LE van, pearl wht, auto, all pwr, alarm, cruise, dual AC, tint, low miles, \$16,750. 646-7528 or 486-0366.

'85 Ford F150 PU w/351, \$4K. x30626 or 479-5594.

'74 Datsun 260Z, 2+2, classic, new brakes, clutch, good cond, \$2.5K. Scott, 944-5624.

'81 Pontiac LeMans, 100K plus mi, V6, auto, PS/PB, AC, good cond, \$1350. 488-1385.

'89 Plymouth Grand Voyager, 6 cyl, loaded, 66.5K mi, good cond, \$10,250. x31538.

'84 Chev Caprice, 4 DR, pwr windows, AC, AM/FM/cass, good cond, \$2200 OBO. Allan, 472-7526.

'78 Porsche 928, brwn w/leather int, auto, ex cond, 75K mi, \$8.5K OBO. Bill, x39980.

'86 Chev Celebrity, 88K mi, PB/PL/PS/PW, 4 DR. 486-7590.

'85 Mercedes 380SL, blk pearl w/gray int, 2 tops, new soft top, 16" Lourinser alloy wheels, AMG effects, new Michelins, 71K mi, US model, records, \$20.4K. Ed, x34411 or 482-7461.

'82 Honda Accord hatchback, parting out, alter, radiator, tires, starter. Tony, x30028 or 486-5707.

'87 BMW 325, 2 DR, bronze w/beige int, auto, ex cond. Troy, 283-5644.

'84 Toyota Corolla SR5, hatchback, low miles, \$2750. 482-1385.

'90 Buick Park Avenue, 36.5K mi, red w/red int, tint, ex cond, \$13.5K. OBO. 482-2231.

'86 Chev Astro Van, V6, auto, custom int, Michelins, maint records, ex cond, 95K mi, \$5.7K. 482-2231.

'84 GMC S15 longbed PU, good cond, \$3.2K OBO. David, 283-5883.

'78 Corvette, glass tops, low miles, ex cond, \$5.9K. 532-2374.

'91 Ford Escort GT, silver, loaded, pwr sunroof, sports bra, car cover, tint, ex cond. Craig, x37416 or 996-8505.

'81 Toyota Cressida, 4 DR, all options, clean, \$1250. Connie, x45520 or 334-6495.

'88 Ford Escort GL, 4 DR, AC, new tires, 70K mi, \$2950. Carl, 334-6495.

## Boats & Planes

'90 16' center console, 88 hp, 22 gal fuel tank, all carpet, ex cond, \$7.2K. 470-2592.

60 HP Evinrude O/B motor, runs good, \$600 negotiable. Frank, 644-9049.

18' Sailable canoe w/sail, flexible ABS shell, mountable on top of car, \$500. Minh, x30992 or 484-2456.

'74 Wellcraft, 18.5' I/O Mercruiser eng, tri hull, walk thru windshield, trlr, needs work, \$1.5K. 326-4276.

## Cycles

26" girls bicycle, \$38. 332-5193.

10 spd modified Raleigh Super Course bicycle, extras, \$275. 486-7535.

Schwinn Sprint bicycle, 23" wheels, 5 spd, maroon, \$150. Bauch, 333-3382.

## Audiovisual & Computers

Conapton Encyclopedia, 31K articles, 10K pictures, 26 complete volumes, unabridged

dictionary, music, speech, sound. Robert, x30778 or 481-6942.

Logitech Trackman portable serial mouse for IBM PC and compatible, for laptop and notebook computers, \$55. Laurie, x35590.

Computer graphics 6 pen plotter, HP compatible, A&B sz media, \$390. Jim, 997-9119.

Blue chip D20/10 daisy wheel printer, \$100. Dorothy, 482-1505.

Amiga 500 computer, 1 MB int, 2 MB expansion, 1084 color monitor, ext 3.5" FD, 2 joysticks, mouse, books & \$350 s/w, ex cond. x30210 or 333-9242.

Sony CD player, 5 disc carousel remote control, was \$300, now \$150. Lee, 486-5313.

IBM PC XT clone w/20 MB HD, 2 5.25 FD, math coprocessor, graphics card, mouse, 2400 baud int modem, mono monitor, s/w, IBM Proprinter, wide carriage, \$500. x45509 or 337-3222.

Conner 40 MB HD, ADI, 1 yr old, \$120. Ed, x34411 or 482-7461.

Bose spkrs, 901 Series IV, full warr, equalizer, \$1.2K. Tom, x36309 or 474-9747.

Mac SE, 9" mono monitor, 20 MB CMS HD, accessory FD, kybd, mouse, dot matrix printer, cables, dust covers, best offer; Tandy 1000TL, 20 MB HD, 5.25 & 3.5 FD, color monitor, pwr switching sys, kybd, dot matrix printer, DMP 132, modem, cables, covers, warranty. Roger, 486-6873.

Sharp AM/FM/cass car stereo, \$70; Pioneer 80 watt spkrs for car stereo, \$70. Scott, x36132.

## Pets and Livestock

AKC Chow Chow pup, blk male, parents on premises, shots/wormed, \$200. Jackie, 282-4337 or 554-7305.

Mini lop rabbits. Gailo, 554-6200.

16 wk old Beagle pup, \$100; petmate pet porter carrier, \$50. David, x35545 or 488-4876.

Lovebirds, cockatiels, parrots, cages; Blue Crown Conure parrot, 1.5 yrs old, tame, does not bite. Trey, 280-2989 or 484-7834.

## Lost and Found

Lost, gray marcasite pin w/amethyst stone in bldg 1 or bldg 45, reward. x30647.

## Household

4 wrought iron patio chairs, need paint, \$10. 280-8746.

Frigidaire refrig, frost free, beverage maker in door, 20 cu ft, ex cond. 488-0876.

Early American loveseat w/matching oversized chair, velour patchwork design, good cond, \$100; 36" righ-handed screen dr, \$15; black louvered frame w/glass for Ford truck, \$30. x35376 or 943-3842.

GE upright freezer, 15 cu ft, good cond, \$100. 996-1655.

8 pc dinette set, tan, good cond, \$75 OBO. x30020 or 538-4004.

8' sofa w/matching rocker/recliner, plush orange, \$300; 13" color tv, \$75; kitchen country dinette brass lamp, \$50. 488-5627.

Waterbed frame/hd/bed w/mirror, qn sz, dk wood, \$50 OBO; 2 swivel rockers, orange, \$50/ea OBO. 996-6062.

Twin mat/box spring, 2 sets, good cond, \$50 both sets. 283-1834 or 332-4807.

Octagon coffee tbl, 2 hexagon end tbls w/beveled glass tops, \$150; 1 coffee table, Qn Anne legs, \$50; 5 horse Craftsman riding mower, needs work, \$100. 482-5324.

China cabinet, \$350; buffet, \$200;

tbl/chairs, \$150; Bentwood dinette set, 40" rd tbl, 4 cane seat chairs, \$300; igloo style dog house, \$35; old elec typewriter, \$25. 282-4849 or 941-3262.

Waterbed matt, Restonic, qn sz w/tubes, takes standard sheets, heater, acces, good cond, \$50. Linda, 244-9658 or 486-6873.

Tiffany ceiling lamp, 19" dia, heavy leaded colored glass, \$65; freestanding orange conical FPL, wood/gas, \$120. 331-5751.

Kenmore microwave oven, \$60; 5' x 3' oak drafting tbl, \$55. 283-5306 or 333-2476.

Qn sz bed, chest of drws, Danish style w/attached nite stands, incl matt, \$350. x34557 or 326-3883.

Qn sz waterbed, oak bookshelf hdbd, full motion matt, \$75; stroller, \$25; playpen, \$10; 2 car seats, \$10/ea, highchair, \$25. Kim, x34099 or 482-8759.

6 pc sectional couch, \$300; Singer sewing machine in maple cabinet, \$200 OBO. 482-9601.

Whirlpool almond apt sz washer, stackable, good cond, \$50; matching dryer needs service, free. x34716.

Rattan furn, 2 swivel rockers, \$50/ea; stool, \$15; loveseat, \$75; plant stand, \$5; rattan/glass coffee tbl, \$25; rattan/glass 4 tier stand, \$65. Floyd, x37467 or 486-4043.

Antique furn, lg buffet, dining rm tbl, seats 6, good cond, \$600. Andy, 332-9105.

Oriental style 13 X 9 rug, \$100; beige contemporary loveseat, \$40; dbl stroller, \$25. x30453 or 474-5609.

25" tv, Bell & Howell/Heath in walnut floor model cabinet, builtin alignment/ test feature w/manuals, \$225. 326-1278.

Matching loveseat/chair, \$125; 2 walnut end tbl spkrs, \$40. 534-6662.

## Wanted

Want students to join a Russian language class taught by a Rice Univ prof, students should be at intermediate level w/ at least 2 yrs exp. Rick, x36042 or Keith, x38024.

Want leather bound Franklin Mint books, full set of china and silver, Bose spkrs, Bose AM-5 Series II. 280-8746.

Want weight bench and weights. 280-8608.

Want memory expansion board for IBM AT 286, at least 2 MB, or trade for 20 MB HD, Seagate ST225. Tu, x35321 or 481-9769.

Want Futon couch/bed/chair w/ frames; qn sz motionless waterbed matt, w/full corner pad/sheets; sandwich meat slicer, stainless steel, capable of 1/4" or less thick cuts; lt. wt. camcorder in ex cond; Nordic Track x-country exerciser. 486-9605.

Want nonsmoking roommate to share 2-2-2 house in Piper's Meadow, no pets, I have a small dog, \$300/mo. + 1/2 util. Tracy, x32526 or 486-3946.

Want camping equip for new cub scout and leader. 286-0022.

Want nonsmoking male or female to rent room in Friendswood area home. 482-1505.

## Miscellaneous

# Project S.P.A.C.E.

## NASA, contractor scientists and engineers work with teachers to 'hook' students into learning

By Kelly Humphries

**W**hen the Texas Science Summit meets later this month, many of the interesting reports they'll be hearing will be about teachers, scientists and engineers who have become Partners in Space.

Among those presentations will be one by a group that includes about 12 JSC planetary scientists who are working with eight area teachers to develop a supplementary curriculum for fourth- and fifth-graders that is based on the concept of the Earth as a space ship.

Partners in Space is a nonprofit corporation formed in 1987 to encourage economic and educational development in the Clear Lake area. The group's board of directors committed itself in 1990 to address the educational crisis that faces America by emphasizing the study of math, science and technology. More than that, it is matching teachers and students with scientists, engineers and other professionals from government and business. It is the only kindergarten through 12th grade member of Texas Space Grant Consortium.

The Spaceship Earth group is one of five teams involved in Partners in Space's Project S.P.A.C.E. (Space Partners Assisting Children's Education). The project is developing a series of math and science curriculum and teacher training materials that motivate student interest in a variety of scientific disciplines. Teachers from participating schools are working with experts to develop the five units in a series called "Give Your Kids Some Space."

Marilyn Lindstrom, the curator of NASA's meteorite collection who works in JSC's Solar System Exploration Division, has been serving as the JSC team technical lead for the Spaceship Earth group, which includes Nancy Robertson of the JSC director's office, Carl Allen and Judy Allton of Lockheed Engineering and Sciences Co., Jaclyn Allen of Dual Inc., and Kam Lulla and David Pitts of the Solar System Exploration Division.

They've been working closely with teachers from four area school districts: Barbara Chaddock of Pasadena's Teague

Elementary, Mary Cummings of LaPorte's College Park Elementary, Ann Defibaugh of Friendswood's Westwood Elementary, Cathy Kennedy and Debbie Lopez of LaPorte's Reid Elementary, Arlene Kovack of Pasadena's Gardens Elementary, Brenda White of Clear Creek's Creekside Elementary and Chris Widener of Clear Creek's Landolt Elementary.

Lindstrom said that her group has been meeting about once a month for about a year and a half, including an intensive workshop at the University of Houston-Clear Lake last summer, and should be finished with its product by this summer. It's in the process of field testing, editing and perfecting the curriculum in the teachers' classrooms.

"I find it really neat to be able to touch the future in this way," Lindstrom said. "I'm a planetary scientist. I really enjoy the work that I do, but sometimes I get the feeling that

there are not more than 50 or 100 people out there who care about the details of what's going on with the Moon or meteorites or whatever. And to be able to take some of what I know and work it to a way that it can teach children how to think about things — it's not that they need to worry about the details of any specific science fact I've got in my head — it's that they can learn to think about it and maybe be excited by it. I still believe that their generation, at least, is going to get out there and do more space exploration."

"Science is frequently presented to students as a set of facts," said Jaclyn Allen. "I know as a scientist that science is an exciting investigation that usually produces more questions than answers, and I really want students to see that excitement in science, that it is a constant progression of investigation. Hopefully this curriculum can help the students see that excitement in investigative science rather than factual memorization."

The Spaceship Earth supplementary curriculum begins by looking at all of the planets in our solar system in a search for

a habitable planet. It does a backward survey as if an extraterrestrial were visiting the solar system for the first time, looking at what the creature's requirements are and which planet satisfies them. The lessons look at the atmosphere and surface conditions of the planets, and invents a set of creatures with requirements different from those of humans. The students record data and match the creatures with the appropriate planets.

"Our main focus was how space technology can enhance students' learning about their own planet and understanding their own planet," Allen said.

The curriculum then goes on to look at how Earth affects humans and how humans affect the Earth, using Earth

observation photographs shot by astronauts, ozone mapping charts and other resources.

"A young lady, the next day, came up to me

and said 'I'd never thought about it before, but we really have to take care of Earth because it's the only place we can live,'" Allen said. "That's exactly what we were trying to come up with and that was very rewarding to have her come up with that comment."

Another part of the lesson plan is looking at how humans can live in extreme environments such as Antarctica. Then, it takes the next step to look at what it takes to live on Moon. The students go through exercises that include measuring the quantity of food in their lunches and measuring how much air they breathe by blowing into paper bags. Then, they design a mission where they can fit a base habitat and supplies into three oatmeal boxes, which represent the payload.

This is designed to compliment their regular science curriculum so that it can be used to help build upon their required science units, Lindstrom said. It also is built to be integrated with the rest of their classes — for example the atmosphere and Moon base units involve a lot of math and most lessons involve writing. The group documented how each lesson meets part of the Texas essential education elements.

"Space and anything at all exotic — those catch their attention," Lindstrom said. "And once you've got their attention, you try to focus it in such a way that they're using both their hands and their heads to figure out what the next step is themselves."

"We call them 'hooks,' and space is definitely a hook," Allen agreed. "And if you can hook a child and continue to challenge them and keep them interested, by golly they end up learning something in the process."

"We're not out trying to convince all the kids to become scientists. But it will enrich their lives overall if they learn to think as a scientist about problems," Lindstrom said.

It's been a learning process, both for the teachers who had to learn what kind of science the NASA people were doing, and for the NASA people to learn what the teachers need.

The teachers also are able make sure the lessons are feasible within the limitations of the classroom; that they use

easily obtained tools and resources. That's one of the reasons the group opted for a videotaped slide show instead of a regular slide show — the teachers pointed out that very few elementary classes have easy access to a slide projector.

"The process of developing these supplements to curriculum is as important as the product," said Linda Blount, who with 20 years of experience in education took over as Partners in Space executive director in November.

Feb. 26 and 27 at the Texas Science Summit, co-sponsored by the Texas Education Association and Partners in Space, all of the new national and state science programs will be showcased for teachers. The summit also shows teachers where national science standards are headed and what projects are being funded by federal government to improve science and math.

Partners in Space receives funding and support from TEA for teacher training. Eleven school districts are now participating, and that should be expanded to 24 by September, Blount said. The Partners in Space teachers eventually will share what all of their Project S.P.A.C.E. teams have done and then show teachers across the state how to use the supplements to invigorate their students.

The other Project S.P.A.C.E. teams and their partners are: Living in Space, The Boeing Company; Mission Planning, Barrios Technology and Rockwell Space Operations Co.; Computers in Space, IBM Federal Sector Division; and Space Station Freedom, McDonnell Douglas Space Systems Co.

A second NASA-sponsored team began working in October on yet another curriculum module, this one based on Mars exploration. Team members from the Exploration Programs Office and the Man-Systems Division are working with teachers to develop background information, student information and lab activities that emphasize the challenges of interplanetary exploration, said Doug Peterson of the Exploration Programs Office. The module will be part of a second curriculum series geared for sixth and seventh-grade students.

Team members are Eileen Stansbery, Al DuPont and Jim Brown of Exploration Programs, Jeri Brown of Man-Systems, and Buddy Pattison of Marshall Space Flight Center. Intermediate school teachers include Brenda White of Creekside, John Ristvey of Seabrook, Steve Frand of McAllen, Olivia Ayala of Pharr, Jerri Jobe of Manvel, Jerry Evans of Copperas Cove and Dennis Johnson of Alvin.

Partners in Space has two other major projects. Pathways is a science and math career exposition that brings together students from grades six through 12 with business and industry representatives at a career fair to emphasize the relevance of math, science and technology in the work place. And Project Liftoff is a Texas Space Grant Consortium outreach project for teachers and students in grades nine through 12 that will be added this summer. The teacher/student experiential team approach to learning will nurture the sense of importance that math and science education have in stimulating interest and improving the outlook for future scientists, engineers, doctors and technicians. □



Left: Jackie Allen demonstrates how volcanoes work as students at Landolt Elementary School get close to the lesson. Below: Teachers working on the Spaceship Earth supplementary curriculum as part of their Partners in Space involvement visit JSC's Lunar Curatorial Laboratory in Bldg. 31. From left are Mary McCombs, Arlene Kovack, Caroline Wiggum, Ann Defibaugh, Barbara Chaddock and JSC's Nancy Robertson and Marilyn Lindstrom (seated).



## PARTNERS IN SPACE



# Evans to represent JSC at 1993 International Space University

Mike Evans, head of the Advanced Program Integration Section in MOD's Flight Design and Dynamics Division, has been selected to represent JSC at this summer's International Space University.

This year's 10-week program begins in June and will be hosted by the University of Alabama at Huntsville. Evans will have an opportunity to work with colleagues from around the world who represent a broad spectrum of cultures and expertise.

ISU is a multidisciplinary, multinational space education and research program. NASA has supported the annual program since 1989 by providing faculty and participants from various centers.

Evans was interviewed by a panel of senior managers at JSC and selected from a group of highly qualified applicants.

## Magazine readers vote Dunbar Engineer of Year

Astronaut Bonnie Dunbar will be honored as Engineer of the Year by Design News magazine in a ceremony next month in Chicago.

JSC

## People

Dunbar is being honored for her work as a space shuttle astronaut and scientist at the magazine's Engineering Achievement Award Presentation on March 9 during the National Design Engineering Show.

Design News' 17,000 readers across the United States voted to give her the award, which carries with it a \$20,000 endowment to the school of her choice. Dunbar split

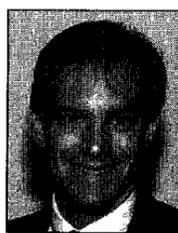
the donation between her two alma maters, the University of Houston and University of Washington.

## Hayes earns spot in aviation hall of fame

NASA Senior Research Pilot Charles F. Hayes recently was inducted into the Oklahoma Aviation and Space Hall of Fame at the Oklahoma Air Space Museum.

Hayes, now chief of Flight Crew Operations' Shuttle Training Support Branch, has taught NASA's astronauts how to fly their ships for more than two decades, including all of those who landed on the Moon, participated in Skylab and the Apollo-Soyuz Test Project and fly the space shuttle.

The native of Wellston, Okla., instructed shuttle pilots through more than 2,000 approach and landing tests in the Shuttle Training Aircraft,



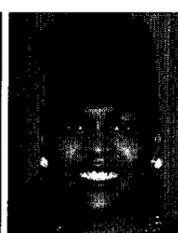
M. Evans



Dunbar



Hayes



S. Evans

preparing for everything from the first drop test of the Space Shuttle Enterprise to the most recent shuttle flight.

## Human Resources' Evans is top secretary

Sharon R. Evans, secretary for the Human Resources Development Branch recently received the Marilyn J. Bocking Award for Secretarial Excellence.

Among her many duties, Evans was responsible for coordinating all of the changes to the annual Training Catalog that was completely redesigned this year. She worked many off-duty hours to ensure that the catalog was of the

highest quality and was instrumental in seeing it completed in a timely manner.

Evans also was cited for her support in the development of the center's first Career Development Guide. She had total responsibility for typing, proofreading and designing the pages and sections of the guide, including some complex career path charts.

In addition, she has provided support for senior staff, Total Quality Steering Committee and Human Resources Office retreats, and has continued to excel as a trainer of junior-level secretaries, clerks, Office Education students and Worker Trainee Opportunity employees.

## Scholarship applications due in March

Applications are now being accepted for two scholarship programs to assist dependents of JSC employees in continuing their education after high school.

Both the JSC Exchange Scholarship Program and the NASA College Scholarship Fund Inc. are accepting applications until March 31.

The JSC Exchange Scholarship Program provides up to \$1,000 per year for four years at any college or university. Three such awards are planned for 1993.

Applicants must plan to graduate from a public, private or parochial high school in 1993 or must currently be enrolled in college with good academic standing. Applicants must have a high school grade average of 2.5 on a 4.0 scale or the equivalent. They must be dependents of JSC employees who have been with the center or its field activities for at least two years.

Applicants will be evaluated on scholastic achievement, financial need and involvement in school and community activities.

High school students will be expected to furnish a transcript of their high school grades and a record of their scores on the Scholastic Aptitude Test or the American College Test with their applications or as soon as they become available, but not later than March 31. Applications are available in Bld. 45, Room 706, or by contacting Nicky Dinick at x33161.

The NASA College Scholarship Fund will be awarding four scholarships of \$1,500 each. The scholarship is renewable for six years, not to exceed \$6,000.

Currently, 12 students representing JSC, Goddard Space Flight Center, Kennedy Space Center, Langley Research Center, Lewis Research Center and Marshall Space Flight Center are receiving assistance through the fund. Thirteen individuals have graduated under the program.

Applicants must be pursuing a course of study that will lead to an undergraduate degree in science or engineering at an accredited college or university in the United States.

Applicants also must be dependents of current or retired NASA employees who have been employed by NASA.

Applications are available in Bldg. 1, Room 840. Completed applications may be mailed to JSC; the NASA College Scholarship Fund Inc.; Mail Code AH12/Scholarship Committee; Houston, Texas; 77058.

For more information contact, Mary O'Connell, x 39168.



JSC Photo

Orbiter and GFE Projects Office Employees of the Year included, from left, Gregory Galbreath, Richard Malecki, Karen Lucht, David Greenthaner, Robert Bizzell, Kathryn Morse and Dennis Dillman.

## Rotter top subsystem manager

Orbiter and GFE Projects Office honors employees

Hank Rotter was named orbiter Subsystem Manager of the Year for 1992 at the Orbiter and GFE Projects Office's recent awards banquet at the Gilruth Center.

JSC Deputy Director Paul J. Weitz presented the award to Rotter, who manages the orbiter's active thermal control system.

An employee of the Crew and Thermal Systems Division, he has been an orbiter subsystem manager since the beginning of the shuttle program and has established one of the best team working relationships between KSC launch operations, JSC and Rockwell to ensure the successful operation of his system during missions. The shuttle's active thermal control system includes the freon cooling loops used to keep electronics and the crew cabin cool during flight as well as other cooling sys-

tems used during ascent and entry.

Rotter also was praised for his support of the Mission Evaluation Room in Mission Control during shuttle flights.

The Orbiter and GFE Office's Employees of the Year for 1992 also received recognition at the banquet.

Honored for their outstanding performances were Gregory Galbreath of the Orbiter Engineering Office; Richard Malecki of the Flight Support Equipment Office; Karen Lucht of the Orbiter and GFE Projects Control Office; David Greenthaner of the Orbiter Avionics Systems Office; Robert Bizzell of the Management Integration Office; Kathryn Morse of the JSC Resident Office at KSC; Dennis Dillman of the Flight Data and Evaluation Office; and Michael Odaka, from the Orbiter Projects Resident Office at Rockwell's Downey, Calif., facility.



Rotter

## Clinton endorsement pleases Andrews

(Continued from page 1)

"I'm very concerned that substantial reductions in funding could destroy the timetable we're working under, could send up costs substantially and for all practical purposes could produce a situation where two or three years from now the project has become nonviable," Gramm said. "Our ability to do this project for the money that we have promised the American taxpayer depends on the flow of cash, depends on the timeliness of the resources."

Cohen reminded Gramm that NASA also has substantial agreements with its international partners on space station — Japan, the European Space Agency and

Canada — which are adding \$8 billion to the \$30 billion being spent by the United States.

Andrews said he was pleased to hear President Clinton's firm statement endorsing the space station on Feb. 5.

"We're not going to have a space station or a super collider or a space program without a President that is for it, endorses it, fights for it," Andrews said.

The battle over the budget, which will include NASA's budget, will be an intense one, Andrews said, but while reports of cost growth are coming at a bad time they must be kept in historical perspective.

"I had that problem in the Apollo

program and the shuttle program," explained Cohen, who last week pledged to find \$10 million at JSC to put toward space station reserves in fiscal 1993. "We don't have the answers yet, but we're in the process of working it."

While there has been some focus on cost growth in the portion of the project managed by JSC, that's primarily because Houston is responsible for 40 to 50 percent of the space station, Andrews said.

"What the men and women of JSC are doing today and over the weekend and in the coming days is to get the cost back down within the budget to a station that we can afford and we can build," Andrews said.

## Astrophysicist is NASA's Inventor of Year for 1992

A NASA astrophysicist whose work in developing x-ray telescopes led to his invention of a revolutionary new microscope, has been named NASA Inventor of the Year for 1992.

Richard B. Hoover of Marshall Space Flight Center was selected for his invention of the Water-Window Imaging X-ray Microscope. This instrument should enable researchers to see in great detail high-contrast x-ray images of proteins, chromosomes and other tiny carbon structures inside living cells. Resolution of the microscope could be so high that it may produce detailed images of the building blocks of life — tiny DNA molecules.

"I believe the microscope has immense potential in many biological and medical research areas," Hoover said. These include genetic and gerontology research; gene splicing and genetic engineering; cancer research and early tumor cell diagnostic imaging; AIDS research including analysis of the viral structure of HIV and assessment of drug interactions; and drug analysis.

The device, which uses x-rays instead of visible light to create ultra-high resolution, high-contrast images, got its "water-window" name because it is designed to operate in a narrow band of the x-ray part of the electromagnetic spectrum at which water transmits or passes x-rays and appears transparent, and carbon absorbs x-rays and becomes opaque. In this "window," the microscope can produce detailed images of the important carbon structures inside a living cell, which is made up primarily of water.

The advance in capability may be as great as the difference between a doctor looking at a conventional photograph and an x-ray, Hoover said.

## Black History Month luncheon tickets available until Tuesday

JSC's observance of Black History Month continues this week with noted speaker Curtis L. Franklin addressing the Black History Month Luncheon.

The luncheon is set for 11:30 a.m. Friday in the Gilruth Center ballroom. Tickets cost \$8 and must be purchased by Tuesday.

Tickets are available from Crystall Mullen, x47432; Mark Falls, x38627; Tamara Martin, x34502; Patricia Burke, x30601; Judy Hollie, x36028; Danny Harwell, x39155; Beverly Green, x38057; Marie Miller, x38694; Norfleet Williams, 282-3669; and Charles Noel, x33219.

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